

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

TERRACE

(feet)
CODE 600

DEFINITION

An earth embankment, a channel, or a combination ridge and channel constructed across the slope.

PURPOSE

- Reduce slope length
- Reduce erosion
- Reduce sediment content in runoff water
- Improve water quality
- Intercept and conduct surface runoff at a nonerosive velocity to a stable outlet
- Retain runoff for moisture conservation
- Prevent gully development
- Reform the land surface
- Reduce flooding

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

1. Water erosion is a problem.
2. There is a need to conserve water.
3. The soils and topography are such that terraces can be constructed and farmed with reasonable effort.

4. A suitable outlet can be provided which will last the life expectancy of the practice.
5. Runoff and sediment can damage land or improvements downstream or impair water quality.

CRITERIA

General. Terraces may be constructed with a broad base, narrow base, or steep backslope cross section. Gradient terraces may use either underground outlets or vegetated surface outlets (including stable natural woody draws). Level terraces may be used on soils with high infiltration rates where water will infiltrate fast enough to prevent crop damage.

Spacing. Terrace spacing is measured from channel to channel (Figure 1). It includes the width of the front slope, backslope and farmed area in between. Horizontal interval is the horizontal distance shown in Figures 2, 3, and 4, depending on cross section type. The horizontal interval for the upper terrace is the average distance from the top of the natural slope to the centerline of the terrace channel.

When necessary, the Revised Universal Soil Loss Equation (RUSLE) shall be used to calculate the maximum horizontal interval for the soil loss tolerance (T) as defined in Section I of the Field Office Technical Guide (FOTG). The calculation will be made using the most intensive anticipated land use, which might possibly occur. This land use may be more intensive than the system planned for use in the immediate future. The "C", "P", and "P_t" factors for the RUSLE calculations shall be based on information obtained from the appropriate tables in Section I-(IV)-A of the Field Office Technical Guide (FOTG). To be

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

practical, a horizontal interval of 105 feet (minimum interval) may be used even if the RUSLE calculation indicates a smaller interval. In no case shall the maximum horizontal interval exceed that shown in Table 1 for the conditions shown.

Table 1 - Maximum Horizontal Interval for Terraces

Slope	Without Contour Stripcropping	With Contour Stripcropping	For Concentrated Flow Control
%	feet	feet	feet
1-2	180	300	300
2-4	150	240	200
4-6	120	180	150
6-9	120	150	120
9-12	100	150	100

Spacings may be adjusted to provide better alignment, location, or to adjust for farm machinery. All adjustments shall be reduced from the maximum shown in Table 1.

Horizontal Interval for Steep Backslope and Narrow Base Terraces

Terrace spacing shall be adjusted to provide for an even number of trips for anticipated row crop equipment and maximum opportunity for changing row widths. Information in the Missouri supplement to NRCS, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook (EFH), Chapter 8 - Terraces or similar computations for equipment widths shall be used to determine the farmable part of the adjusted terrace spacing. All adjustments shall be reduced from the maximums shown in Table 1.

The drainage area above the top terrace should not exceed the area that would be drained by a terrace of equal length with normal spacing. The top terrace shall be replaced by a diversion or water and sediment control basin when the interval between ridge top and the top terrace becomes too great because of farmstead, pasture, woodland, or property boundary limits.

Alignment. Terraces shall be parallel if feasible and as parallel as practicable. Curves shall be long and gentle to accommodate farm machinery. Land forming, extra cut or fill along the terrace line, multiple outlets, variations in

grade, channel blocks, and other methods shall be used to achieve good alignment. See University of Missouri Agricultural Engineering Guide 1500. "Choosing Terrace Systems" for a discussion on alignment.

Capacity. The terrace shall have enough capacity to control the runoff from a 10-year frequency, 24-hour storm without overtopping. For terraces with underground outlets, the capacity shall be increased by the estimated 10-year sediment accumulation, unless provisions are made to maintain the design capacity through maintenance. Construction drawings or specifications and the conservation plan shall indicate the anticipated amount and frequency of sediment removal if this option is used to maintain capacity. Sediment volume may be estimated by using Table 9 of the Missouri Supplement to the EFH, Chapter 8 - Terraces. Terrace systems designed to provide flood protection or to function with other structures shall have adequate capacity to control a storm of a frequency consistent with the potential hazard. When the capacity is determined by the formula $Q = AV$ and the V is calculated by using Manning's Formula, an "n" value of 0.06 shall be used for bare channels; and the SCS-TP-61, Handbook of Channel Design for Soil and Water Conservation or equivalent, shall be used for vegetated channels.

Table 6 of the Missouri Supplement to the EFH, Chapter 8 - Terraces may be used to determine minimum settled ridge height for gradient terraces.

CROSS SECTION

General. The terrace cross section shall be proportioned to fit the land slope, the crops grown and the farm machinery used. Additional height shall be added if necessary to provide for settlement, channel sediment deposits, ridge erosion, the effect of normal tillage operations, and safety. The ridge shall have a minimum width of 3 feet at the design elevation. The steepest constructed slope of a vegetated front or back ridge slope is 2 (horizontal - H):1 (vertical - V). Farmable ridge and cut slopes must be 5 (H):1(V) or flatter. The opening at the outlet end of gradient and open end level terraces shall have a cross section equal to that specified for the terrace channel.

All terrace cross sections shall comply with the minimum dimensions shown in the Missouri Supplement to EFH, Chapter 8 - Terraces for broad base terraces (Figure 2), steep backslope terraces (Figure 3), or narrow base terraces (Figure 4).

Broad base cross section. Excavation for the terrace ridge is generally made on the uphill side. The cutslope, front slope, and backslope of the broad base terraces may be farmed. Building a broad base terrace cross section from the uphill side can increase the slope of the land by 5 percent.

Steep backslope cross section. Excavation for steep backslope terraces shall be made from the downhill side except where cuts and fills are required to improve alignment. Guide dimensions for steep backslope terraces are shown in the Missouri Supplement to EFH, Chapter 8 - Terraces. The backslope must be seeded to grass. This type of terrace decreases the slope of the land between terraces by 2 to 4 percent. Steep backslope terraces are recommended for all field slopes.

Narrow base cross section. Both the front and the backslope of narrow base terraces are seeded to grass and not farmed. Excavation for narrow base terraces shall be made from the downhill side except where channel cuts and fills are required to improve alignment. Guide dimensions for narrow base terraces are shown in the Missouri Supplement EFH, Chapter 8 - Terraces. Narrow base terraces are recommended for all land slopes.

End closures. Level terraces may have open ends, partial end closures, or complete end closures. Partial and complete end closures shall be used only on soils and slopes where the stored water will be absorbed by the soil without appreciable crop damage or where underground outlets are provided.

If terraces with closed or partly closed ends are specified, the end closures must be installed before the terraces are complete. The end closures shall be designed so that the water flows over the end closure before overtopping the terrace ridge.

Partial end closures shall not be more than half the effective height of the terrace ridge. Complete end closures are more than half the

height of the ridge. The cross section of the closures may be less than the terrace cross section.

Terrace channel blocks. Terrace channel blocks may be needed to confine water to the storage basin when underground outlets are used. The top elevation of these blocks shall be the same as the design elevation of the terrace ridge. The cross section of the blocks shall have a minimum top width of 6 feet and side slopes 5 (H):1 (V) or flatter to avoid being destroyed by normal tillage operations.

Channel grade. Channel grade shall be determined by one of the following methods:

1. Maximum channel velocity for farmed channels shall be nonerosive for the soil and planned treatment. Maximum velocity for erosion resistant soils is 2.5 feet per second, for average erodible soils 2.0 feet per second, and for easily erodible soils 1.5 feet per second. Velocities are to be computed by Manning's Formula, using an "n" value of 0.035. Table 4 and 5 of the Missouri Supplement to EFH, Chapter 8 - Terraces may be used to determine maximum channel grades.

2. Maximum channel velocities for permanently vegetated channel shall not exceed those used for grassed waterways.

Channel grades may be uniform or variable. Channel velocity shall not exceed that which is nonerosive for the soil and planned treatment. For short distances and in upper reaches, channel grades or velocities may be increased to improve alignment. If terraces have an underground outlet, water and sediment will pond in the channel, thus reducing velocities and allowing steeper channel grades near the outlet. Minimum grades shall be such that ponding in the channel because of minor irregularities will not cause serious damage to crops or delay field operations.

Terrace lengths. The volume of water stored in level terraces is proportional to the length. Therefore, it is necessary that the length be held within reason so that damage in case of a break is minimized. Level terrace length shall not exceed 3,500 feet unless the channel is blocked at intervals not exceeding 3,500 feet. Normally, the gradient terrace length is

controlled by capacity and the nonerosive velocity requirement.

Outlets. All terraces must have adequate outlets. Construction shall not be done on the right-of-way of a public road or highway or other public utility until the landuser obtains approval from the proper authorities. All water should leave property at its natural outlet unless proper permits are obtained.

Vegetated outlets may be used for gradient or open-end level terraces. Such an outlet may be a grassed waterway (412), a grade stabilization structure (410), a vegetated area, or a stable, natural woody draw. The outlet must convey runoff water to a point where the outflow will not cause damage. Outlets shall be installed and vegetated before the terrace is constructed if necessary to provide a stable non-erodible outlet or to insure establishment of vegetative cover. The water surface in the terrace shall not be lower than the water surface in the outlet at their junction when both are operating at design flow. The drop from the bottom of the terrace to the bottom of the vegetated outlet should be between 0.3 feet and 1.0 feet.

Underground outlets may be used on gradient or level terraces. The outlet consists of an intake and an underground conduit. An orifice plate, increase in conduit size, or other features shall be installed as needed to control the release rate and prevent excessive pressure when more than one terrace discharges into the same conduit. The discharge, when combined with the storage, shall be such that a 10-year frequency, 24-hour storm will not overtop the terrace, and growing crops will not be damaged significantly by standing water. The release time shall not exceed 48 hours for the design storm. Shorter periods may be necessary for some crops, depending on soil characteristics and water tolerance of crops to be grown.

The underground outlet shall meet the requirements specified for Conservation Practice Standard (620) Underground Outlet or for Conservation Practice Standard (606) Subsurface Drain. Conduits must be installed deep enough to prevent damage from tillage equipment. The inlet shall consist of a vertical perforated pipe of a material suitable for the intended purpose. The inlet shall be located uphill of the terrace ridge front slope, if farmed,

to permit passage of farm machinery and, if necessary, provide for the anticipated accumulation of sediment. The outlet of the conduit shall have adequate capacity for the design flow without causing erosion.

Soil infiltration may be used as the outlet for level terraces. Soil infiltration must permit drainage of the design storm from the terrace channel within a reasonable period so that crops are not significantly damaged by standing water.

Combinations of different types of outlets may be used on the same system to maximize water conservation and to provide for economical installation of a more farmable system.

Vegetation. Steep backslope and narrow base terraces shall be established to grass as soon as practicable after construction. The vegetation shall be maintained, and trees and brush controlled by chemical or mechanical means.

Seedbed preparation, seeding, fertilizing and mulching shall comply with the Conservation Practice Standard (342) Critical Area Planting.

Safety. Terrace ridges, especially those with steep backslopes, can be very hazardous. For this reason, some producers prefer steep front slopes, thus keeping machinery away from the steep backslopes. All cut slopes and fills that are to be farmed must be no steeper than those on which farm equipment can operate safely. Any hazards must be brought to the attention of the responsible person.

CONSIDERATIONS

A terrace system properly installed may affect the landslope (S) and length of slope (L) for RUSLE calculations. If construction and installation will change these factors, recalculate the sheet and rill prediction with "after construction" values for landslope and slope length.

A terrace system may address ephemeral erosion as well as sheet and rill. Appropriate estimating methods should be used to evaluate the land surface.

Normally Land Capability Classes I, II, III, and IV are suitable for mechanized production of commonly grown field crops if properly managed. If Land Capability Classes V, VI, or VII conditions are present, strong consideration should be given to land use conversion.

Field efficiency may be used to compare alternative terrace systems. Field efficiency is the ratio of time required to farm the field being planned to that required to farm a rectangular field of the same acreage, 1/2 mile long. Terrace system layout should improve farmability. Producer's desires should be considered when determining alignment.

The amount of earth fill material needed to construct a terrace ridge can increase by 400 percent (or more) when comparing a broad base cross section with a narrow base cross section.

Broad base terraces are not recommended on land with slopes steeper than 8 percent. This would increase landslope between the terraces. The steep backslopes of the terraces will make farming more difficult.

Level terraces may cause leaching of agricultural chemicals into the groundwater by infiltration.

Consider all types of outlets in order to minimize adverse impacts on downstream water quality. Use of grass filter strips around inlets to underground outlets may be beneficial.

Outletting underground outlets onto a vegetated area, not directly into a watercourse, may be beneficial to downstream water quality.

PLANS AND SPECIFICATIONS

Plans and specifications for installing terraces shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed for maintaining terrace capacity, storage, ridge height, and outlets. Each inlet for underground outlets must be kept clean and sediment buildup redistributed so that the inlet is in the lowest place. Inlets damaged or cut off by farm machinery must be replaced or repaired immediately.

The following University of Missouri Agricultural Guides provide information on the operation and maintenance of terrace systems and their outlets:

1501 "Operating and Maintaining Underground Outlet Terrace Systems"

1503 "Operating and Maintaining Grassed Outlet Terrace Systems"

1504 "Maintaining Grassed Waterways"

Figure 1
Terrace Spacing

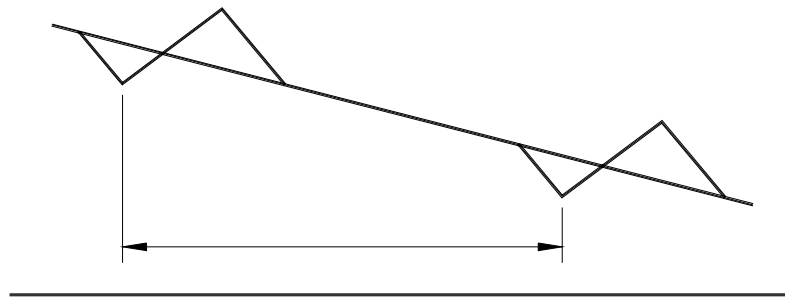


Figure 2
Horizontal Interval for Broad-Based Terraces

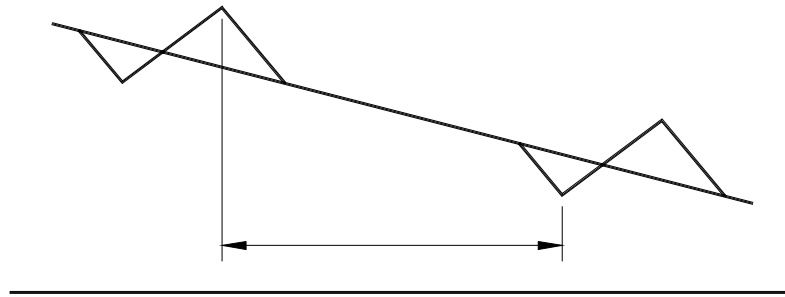


Figure 3
Horizontal Interval for Steep Back-Slope Terraces

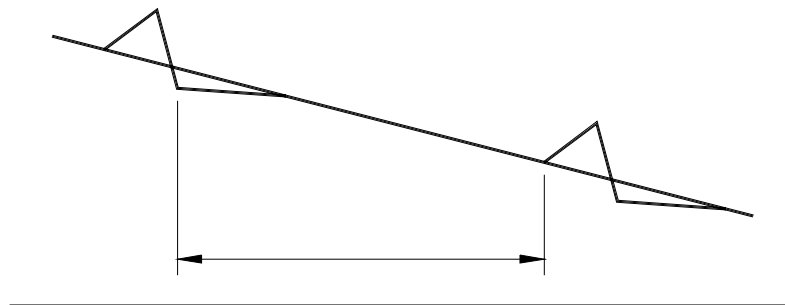
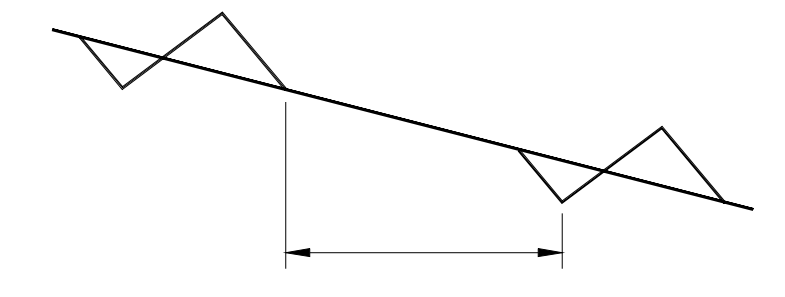


Figure 4
Horizontal Interval for Narrow-Based Terraces



Not to scale

**NATURAL RESOURCES CONSERVATION SERVICE
OPERATION AND MAINTENANCE**

FOR

**TERRACE
BROAD BASE
(feet)
CODE 600**

The following University of Missouri Agricultural Guides provide information on the operation and maintenance of terrace systems and their outlets:

1501 "Operating and Maintaining Underground Outlet Terrace Systems"

1503 "Operating and Maintaining Grassed Outlet Terrace Systems"

1504 "Maintaining Grassed Waterways"

Other operation and maintenance items to address:

1. Maintain ridge height.
2. Raise any low spots in terrace ridge to reestablish the design ridge elevation.
3. Regrade channel flowline to maintain positive drainage to all outlets. Remove sediment accumulations to reestablish design channel elevations.
4. Repair any spots of erosion in ridge cross section.

Additional Details: _____

PAGE LEFT BLANK ON PURPOSE

**NATURAL RESOURCES CONSERVATION SERVICE
OPERATION AND MAINTENANCE**

FOR

**TERRACE
STEEP BACKSLOPE
(feet)
CODE 600**

The following University of Missouri Agricultural Guides provide information on the operation and maintenance of terrace systems and their outlets:

1501 "Operating and Maintaining Under-ground Outlet Terrace Systems"

1503 "Operating and Maintaining Grassed Outlet Terrace Systems"

1504 "Maintaining Grassed Waterways"

Other operation and maintenance items to address:

1. Maintain ridge height.

2. Raise any low spots in terrace ridge to reestablish the design ridge elevation.

3. Regrade channel flowline to maintain positive drainage to all outlets. Remove sediment accumulations to reestablish design channel elevations.

4. Repair any spots of erosion in ridge cross section.

5. Reseed any bare spots in backslope of terrace.

6. Fertilize, if applicable, to maintain vegetation.

Additional Details: _____

PAGE LEFT BLANK ON PURPOSE

**NATURAL RESOURCES CONSERVATION SERVICE
OPERATION AND MAINTENANCE**

FOR

**TERRACE
NARROW BASE
(feet)
CODE 600**

The following University of Missouri Agricultural Guides provide information on the operation and maintenance of terrace systems and their outlets:

1501 "Operating and Maintaining Underground Outlet Terrace Systems"

1503 "Operating and Maintaining Grassed Outlet Terrace Systems"

1504 "Maintaining Grassed Waterways"

Other operation and maintenance items to address:

1. Maintain ridge height.

2. Raise any low spots in terrace ridge to reestablish the design ridge elevation.

3. Regrade channel flowline to maintain positive drainage to all outlets. Remove sediment accumulations to reestablish design channel elevations.

4. Repair any spots of erosion in ridge cross section.

5. Reseed any bare spots in frontslope and backslope of terrace.

6. Fertilize, if applicable, to maintain vegetation.

Additional Details: _____

PAGE LEFT BLANK ON PURPOSE

**NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION**

FOR

**TERRACE
BROAD BASE
(feet)
CODE 600****General**

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Contractor shall be assured that all state laws concerning buried utilities have been met.

Site preparation

All dead furrows, ditches, or gullies shall be filled before constructing the terrace or shall be part of the construction. All old terraces and other obstructions shall be removed, as necessary, to install a farmable system.

Terrace construction

The terrace shall be constructed according to the planned alignment, grade, and cross section with the specified overfill for settlement and the channel to drain. Farmable ridge and cut slopes must be 5 (horizontal - H):1 (vertical - V) or flatter.

The minimum moisture content for obtaining the required compaction shall be such that when the material is kneaded in the hand, it will form a ball

which does not readily separate. Fill material that is too dry shall have water added or work

shall be stopped until moisture conditions are satisfactory.

Earthfill shall be placed in 9 inch layers. Each layer will be compacted by complete coverage by at least two passes with the hauling and spreading equipment or equivalent. Care must be taken to assure proper compaction and bond of the fill material to the existing fill. The side slopes of the existing fill shall be excavated until moist material is uncovered and a good bond can be attained.

Any ditch or depression at the bottom of the backslope shall be filled and smoothed so that drainage will be away from the terrace and not parallel to it. Terrace ridges constructed across gullies or depressions shall be compacted to insure proper functioning of the terrace.

Any channel blocks shall have a minimum top width of 6 feet and side slopes 5 (H):1 (V) or flatter unless shown otherwise on the drawings.

Cuts and fills should be made in such a manner that topography will be enhanced. Excavation for broad base terraces is generally made on the uphill side. Excessive cuts should not be made in depressions to secure borrow to build the terrace ridge. Borrow for large fills across depressions shall be taken from the intervening ridges, preferably immediately below the terrace ridge, which will tend to flatten the area to be farmed.

The surface of the finished terrace shall be reasonably smooth and present a workmanlike finish.

If required on the drawings, topsoil shall be stockpiled and spread over excavations and other areas to facilitate restoration of productivity.

600-2

When underground conduits are used as an outlet to a terrace, they shall be constructed according to Missouri Construction Specification for Underground Outlet (620) or as shown on drawings.

Provisions must be made to prevent piping if underground circuits are located under terrace ridges. Mechanical compaction, water packing, trench sidewall sloping, and installation and

backfill of conduit trenches early enough to allow adequate settlement are methods that can be used. The materials used for the inlet and the conduit shall be suitable for the purpose intended, see Conservation Practice Standard (620) Underground Outlet. Terrace ridges constructed across gullies or depressions shall be compacted by machinery travel or by other suitable means to insure proper functioning of the terrace.

Additional Details: _____

**NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION**

FOR

**TERRACE
STEEP BACKSLOPE
(feet)
CODE 600****General**

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field. Contractor shall be assured that all state laws concerning buried utilities are met.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

Site preparation

All dead furrows, ditches, or gullies shall be filled before constructing the terrace or shall be part of the construction. All old terraces and other obstructions shall be removed, as necessary, to install a farmable system.

Terrace construction

The terrace shall be constructed according to the planned alignment, grade, and cross section with the specified overfill for settlement and the channel to drain reasonably well. The constructed slope of the vegetated backslope must be 2 (horizontal - H) :1 (vertical - V) or flatter. Cut slopes must be 5 (H) :1 (V) or flatter.

The minimum moisture content for obtaining the required compaction shall be such that when the material is kneaded in the hand, it will form a ball

which does not readily separate. Fill material that is too dry shall have water added or work shall be stopped until moisture conditions are satisfactory.

Earthfill shall be placed in 9 inch layers. Each layer will be compacted by complete coverage by at least two passes with the hauling and spreading equipment or equivalent. Care must be taken to assure proper compaction and bond of the fill material to the existing fill. The side slopes of the existing fill shall be excavated until moist material is uncovered and a good bond can be attained.

Any ditch or depression at the bottom of the backslope shall be filled and smoothed so that drainage will be away from the terrace and not parallel to it. Terrace ridges constructed across gullies or depressions shall be compacted to insure proper functioning of the terrace.

Any channel blocks shall have a minimum top width of 6 feet and side slopes 5:1 or flatter unless shown otherwise on the drawings.

Cuts and fills should be made in such a manner that topography will be enhanced. Excavation for steep backslope terraces should be made from the downhill side except where cuts and fills are required to improve alignment. Excessive cuts should not be made in depressions to secure borrow to build the terrace ridge. Borrow for large fills across depressions shall be taken from the intervening ridges, preferably immediately below the terrace ridge, which will tend to flatten the area to be farmed.

The surface of the finished terrace shall be reasonably smooth and present a workmanlike finish.

600-2

The vegetated portions of steep backslope terraces shall be uniform and be left in a condition which will allow adequate seedbed preparation.

If required on the drawings, topsoil shall be stockpiled and spread over excavations and other areas to facilitate restoration of productivity. If vegetation is required, seedbed preparation, fertilizing, seeding, and mulching shall comply with specifications in technical guides

When underground conduits are used as an outlet to a terrace, they shall be constructed according to Missouri Construction Specification for Underground Outlet (620) or as shown on the drawings.

Provisions must be made to prevent piping if underground circuits are located under terrace ridges. Mechanical compaction, water packing, trench sidewall sloping, and installation and

backfill of conduit trenches early enough to allow adequate settlement are methods that can be used. The materials used for the inlet and the conduit shall be suitable for the purpose intended, see Conservation Practice Standard (620) Underground Outlet. Terrace ridges constructed across gullies or depressions shall be compacted by machinery travel or by other suitable means to insure proper functioning of the terrace.

Vegetation

Steep backslope terraces shall have the entire backslope seeded.

Topsoil shall be added, if needed, to establish vegetation. Refer to JS-AGRON-25 or seeding and mulching recommendations or equivalent.

Additional Details: _____

**NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION**

FOR

**TERRACE
NARROW BASE
(feet)
CODE 600****General**

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Contractor shall be assured that all state laws concerning buried utilities are met.

Site preparation

All dead furrows, ditches, or gullies shall be filled before constructing the terrace or shall be part of the construction. All old terraces and other obstructions shall be removed, as necessary, to install a farmable system.

Terrace construction

The terrace shall be constructed according to the planned alignment, grade, and cross section with the specified overfill for settlement and the channel to drain reasonably well. The constructed side slopes must be 2 (horizontal -H) :1 (vertical -V) or flatter. Cut slopes must be 5 (H) :1 (V) or flatter.

The minimum moisture content for obtaining the required compaction shall be such that when the material is kneaded in the hand, it will form a ball which does not readily separate. Fill material that

is too dry shall have water added or work shall be stopped until moisture conditions are satisfactory.

Earthfill shall be placed in 9 inch layers. Each layer will be compacted by complete coverage by at least two passes with the hauling and spreading equipment or equivalent. Care must be taken to assure proper compaction and bond of the fill material to the existing fill. The side slopes of the existing fill shall be excavated until moist material is uncovered and a good bond can be attained.

Any ditch or depression at the bottom of the backslope shall be filled and smoothed so that drainage will be away from the terrace and not parallel to it. Terrace ridges constructed across gullies or depressions shall be compacted to insure proper functioning of the terrace.

Any channel blocks shall have a minimum top width of 6 feet and side slopes 5 (H) : 1 (V) or flatter unless shown otherwise on the drawings.

Cuts and fills should be made in such a manner that topography will be enhanced. Excavation for narrow base terraces should be made from the downhill side except where cuts and fills are required to improve alignment. Excessive cuts should not be made in depressions to secure borrow to build the terrace ridge. Borrow for large fills across depressions shall be taken from the intervening ridges, preferably immediately below the terrace ridge, which will tend to flatten the area to be farmed.

The vegetated portions of narrow base terraces shall be uniform and be left in a condition which will allow adequate seedbed preparation. The surface of the finished terrace shall be reasonably smooth and present a workmanlike finish.

If required on the drawings, topsoil shall be stockpiled and spread over excavations and other areas to facilitate restoration of productivity.

600-2

If vegetation is required, seedbed preparation, fertilizing, seeding, and mulching shall comply with specifications in technical guides

When underground conduits are used as an outlet to a terrace, they shall be constructed according to Missouri Construction Specification for Underground Outlet (620) or as shown on the drawings.

Provisions must be made to prevent piping if underground circuits are located under terrace ridges. Mechanical compaction, water packing, trench sidewall sloping, and installation and backfill of conduit trenches early enough to allow adequate settlement are methods that can be used. The materials used for the inlet and the

conduit shall be suitable for the purpose intended, see Conservation Practice Standard (620) Underground Outlet. Terrace ridges constructed across gullies or depressions shall be compacted by machinery travel or by other suitable means to insure proper functioning of the terrace.

Vegetation

Narrow base terraces shall have both the backslope and the front slope seeded.

Refer to JS-AGRON-25 or seeding and mulching recommendations or equivalent.

Additional Details: _____

